MAGIC23 Workshop (Matter, Astrophysics, Gravitation, Ions and Cosmology)



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Finding Structure in the Speed of Sound of Dense Matter

Analyses that connect astrophysical observations of neutron stars with nuclear matter properties sometimes rely on equation-of-state insensitive relations. We show that the slope of the binary Love relations (i.e. between the tidal deformabilities of binary neutron stars) encodes the rate of change of the nuclear matter speed of sound below three times nuclear saturation density. Twin stars lead to relations that present a signature ''hill', ''drop", and ''swoosh" due to the second (mass-radius) stable branch, requiring a new description of the binary love relations.

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